

CLAIMS

[1] A variable valve operating device for an engine to adjust a valve lift and a valve timing of the engine, comprising:

a rocking cam which is rocked by a cam provided on a rotatable cam shaft;

a rocking cam support member that rockably supports the rocking cam;

a valve which is opened and closed by a rocking motion of the rocking cam;

a rocking position changing unit that moves the rocking cam support member to change a rocking position of the rocking cam; and

a lock unit that can fix the rocking cam support member so as not to move during a valve-opening period of the valve.

[2] The variable valve operating device for an engine according to claim 1, wherein the lock unit comprises:

a support base that movably supports the rocking cam support member;

an external force applying unit that applies an external force to the rocking cam support member; and

a fixing and holding unit that integrally holds the rocking cam

support member on the support base when the external force applying unit applies the external force to the rocking cam support member.

[3] The variable valve operating device for an engine according to claim 1, wherein the lock unit comprises:

a support base that movably supports the rocking cam support member; and

a push-link which is rocked by an actuator and which pushes the rocking cam support member toward the support base when a tip end side of the push-link abuts against the rocking cam support member.

[4] The variable valve operating device for an engine according to claim 1, wherein the lock unit comprises:

a support base that movably supports the rocking cam support member; and

a push-link which is rocked by a switch cam integrally formed on the rocking cam and which pushes the rocking cam support member toward the support base when a tip end side of the push-link abuts against the rocking cam support member.

[5] The variable valve operating device for an engine according to claim

3, wherein the tip end side abuts against the rocking cam support member in a state where the push-link is slightly inclined from a vertical state with respect to the rocking cam support member.

[6] The variable valve operating device for an engine according to claim 4, wherein the tip end side abuts against the rocking cam support member in a state where the push-link is slightly inclined from a vertical state with respect to the rocking cam support member.

[7] The variable valve operating device for an engine according to claim 1,

wherein the lock unit comprises a lock cam which can turn in association with a valve opening turning motion of the rocking cam; and

wherein the lock cam comprises a stopper which is pushed against a fixed portion when the lock cam is turned by a predetermined amount.

[8] The variable valve operating device for an engine according to any one of claims 1 to 7, wherein the rocking position changing unit comprises:

a turnable control shaft; and

a push moving positioning member that pushes and moves the rocking cam support member to position the rocking cam support member

by turning the control shaft to change a rocking position of the rocking cam.

[9] The variable valve operating device for an engine according to claim 8,

wherein the push moving positioning member is turnably provided on the control shaft; and

wherein a biasing unit that holds the push moving positioning member at a predetermined position is provided between the control shaft and the push moving positioning member.

[10] The variable valve operating device for an engine according to claim 8, wherein an energy-storing mechanism that stores energy for moving the rocking cam support member is provided between the push moving positioning member and the rocking cam support member.

[11] The variable valve operating device for an engine according to claim 8, wherein a common control shaft includes the valves and the push moving positioning members in equal numbers.

[12] The variable valve operating device for an engine according to claim 9, wherein a common control shaft includes the valves and the push

moving positioning members in equal numbers.

[13] The variable valve operating device for an engine according to claim 10, wherein a common control shaft includes the valves and the push moving positioning members in equal numbers.

[14] The variable valve operating device for an engine according to claim 11, wherein a turning unit that turns the control shaft comprises a manual wire or an actuator.

[15] The variable valve operating device for an engine according to claim 12, wherein a turning unit that turns the control shaft comprises a manual wire or an actuator.

[16] The variable valve operating device for an engine according to claim 13, wherein a turning unit that turns the control shaft comprises a manual wire or an actuator.

[17] A variable valve operating device for an engine to adjust a valve lift and a valve timing of the engine, comprising:

a rocking cam which is rocked by a cam provided on a rotatable

cam shaft;

a rocking cam support member that rockably supports the rocking cam;

a valve which is opened and closed by a rocking motion of the rocking cam;

a rocking position changing unit that moves the rocking cam support member to change a rocking position of the rocking cam; and

a lock unit that can fix the rocking cam support member so as not to move during a valve-opening period of the valve,

wherein the rocking cam support member is disposed between a movable element which is movably provided on the rocking position changing unit and a support base fixed to the rocking position changing unit; and

wherein the rocking cam support member is provided between a restriction surface provided on the movable element and the support base such that the rocking cam support member can be sandwiched and fixed therebetween.

[18] The variable valve operating device for an engine according to claim 17,

wherein the rocking cam support member comprises, at its both

ends, rocking cams such that the rocking cams can rock; and

wherein a cross sectional shape of a central portion of the rocking cam support member comprises:

a narrow portion which is narrower than a distance size between the restriction surface of the movable element and the support base portion; and

a wide portion which is slightly wider than the distance size.

[19] The variable valve operating device for an engine according to claim 18, wherein the movable element comprises a positioning portion which can abut against the rocking cam support member at a position away from the restriction surface.